DIMORPHISM IN PAPILIO PUPAE.

D. G. SEVASTOPULO, F.R.E.S.*

In a previous paper (Sevastopulo, 1974/5) I described an experiment with the pupae of *Papilio demodocus* Esp. Unfortunately the rate of brown to green/pink pupae was seriously distorted by the inclusion of a considerable number of pupae from larvae reared in crowded cultures of a dozen or so per container, instead of singly. All the pupae from the crowded larvae were, without exception, brown even when formed among leaves in the jars in which they had fed up.

For the benefit of those to whom the previous paper is not available, the following is a brief description of my *modus operandi.* The larvae were collected from Citrus trees growing in my garden at Mombasa, either as ova or in their 1st, 2nd or 3rd instars, and reared to maturity in individual clear glass jars of about 2" in height and 1¼" in diameter. As soon as they had passed their final evacuation, they were transferred to the pupation chambers, glass jars of about 4" in height and 1¾" in diameter, either lined inside with sand-paper or with sand-paper wrapped round the outside, the jars being capped either with a square of sand-paper under a weight to keep the larva from escaping, or by a piece of glass covered by sand-paper. These jars were then placed in a closed wooden box and left for thirty-six hours, by which time the larva had pupated and the pupa had dried and hardened. The last evacuation was usually passed about 8 p.m., the larva had hung up in its chosen pupation site some twelve hours after wandering had commenced and had pupated some twelve hours later. It will be seen that the only variable was the texture of the surface on which the larva pupated, all other conditions being the same.

Results were as follows, and I have added the previous percentages in brackets:—

	Rough		Smooth	
Brown	27	84.38% (94.34%)	11	37.93% (53.20%)
Green	2	6.25% (1.89%)	10	34.48% (23.40%)
Pink	3	9.37% (3.77%)	8	27.59% (23.40%)
Total	32		29	

Ten larvae, either by accident or design, were allowed to pupate in the jars in which they fed up, and these produced 6 (60%) green pupae and 4 (40%) pink. In the previous experiment all the larvae from the crowded larvae were brown, but none from the individually reared larvae.

It appears, therefore, that crowding the larvae produces 100% brown pupae, and that pupation on a rough surface produces a considerably higher proportion of brown pupae than pupation on a smooth one. These are facts, but I can make no suggestion as to the reason. One factor can be ruled out entirely, not a single pupa went into diapause. Diapause is often considered an important factor in temperate climates.

*P.O. Box 95617, Mombasa (Nyali)

In nature the larvae usually pupate in the Citrus tree on which they have fed up, and remain green throughout the wandering phase.

Two recent papers concern pupal dimorphism in two American papilionids, *Battus philenor* (L.) and *Papilio polyxenes* F.

The first (West & Hazel, 1979) describes the natural pupation sites of the two species, *philenor* on exposed surfaces of tree trunks and cliffs well off the ground, and *polyxenes* on thin weeds and grass stems or on stumps and fence posts. It was noticed that autumn pupae, i.e. diapausing, chose broader supports than summer ones.

The second (Hazel & West, 1979) describes experiments with the two species using pupating substrates differing in both colour and texture. It was found that on a rough surface *philenor* produced 100% brown pupae irrespective of the colour – red, blue, green or yellow – but on a smooth substrate (the coloured paper wrapped outside a plastic container) there was a difference, blue producing 94% brown, red 57%, green 55% and yellow only 18%. With *polyxenes* there were differences on both surfaces, rough red producing 97% brown, rough blue 94% and rough green 2%, whilst smooth red produced 2%, smooth blue 29% and smooth green 6%, yellow both rough and smooth produced no brown pupae. Unlike my *demodocus* larvae, most of the American larvae were ready to start wandering about midday, so that their wandering took place during the hours of daylight, or at any rate partially, so that their choice of pupation site could have been influenced by both colour and texture. In the case of *demodocus*, where the wandering starts well after nightfall and the larva has suspended itself well before dawn, choice of site can only be affected by texture, and colour can only come into play during the pharate stage.

It is difficult to see what advantage the pink form affords as it is fairly conspicuous both among leaves and on tree trunks.

References

D. G. Sevastopulo, 1974/5, Dimorphism in Papilio Pupae, *Ent. Rec.*, **86**: 269 & 87 : 109.

D. A. West & W. N. Hazel, 1979, Natural pupation sites of swallowtail butterflies (Lepidoptera, Papilioninae) : *Papilio polyxenes* Fabr., *P. glaucus* L. and *Battus philenor* (L.), *Ecological Entomology*, **4** : 387-392.

W. N. Hazel & D. A. West, 1979, Environmental control of pupal colour in Swallowtail butterflies (Lepidoptera, Papilioninae), *Ecological Entomology*, **4** : 393-400

HAPLOTINEA INSECTELLA F. IN KENT — A visit to Steps Hill Wood, Stockbury on 25th August 1979 produced a single female in fine condition of this local tineid, which I beat from dense roadside thicket of dry, dead branches and brambles. The specimen was submitted to Dr. J. D. Bradley, who kindly determined it from the genitalia. – N.F. HEAL, "Fosters", Detling Hill, Maidstone, Kent. [This appears to be the first record for Kent of *H. insectella*. – J. M. C. – H.]